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*Published in:*

Poster abstract in the Proceedings of the 13th World Congress on Anaerobic Digestion

*Publication date:*

2013

*Document Version*

Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*

Jurado, E., Hansen, M. A. T., Gavala, H. N., & Skiadas, I. (2013). Compositional changes in swine manure fibers treated with aqueous ammonia soaking (AAS) resulting in increased methane potential. In *Poster abstract in the Proceedings of the 13th World Congress on Anaerobic Digestion: Recovering (bio) Resources for the World IWA Publishing*. <http://www.ad13.org/>

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# Structural and molecular changes in swine manure fibers pretreated with aqueous ammonia soaking (AAS).



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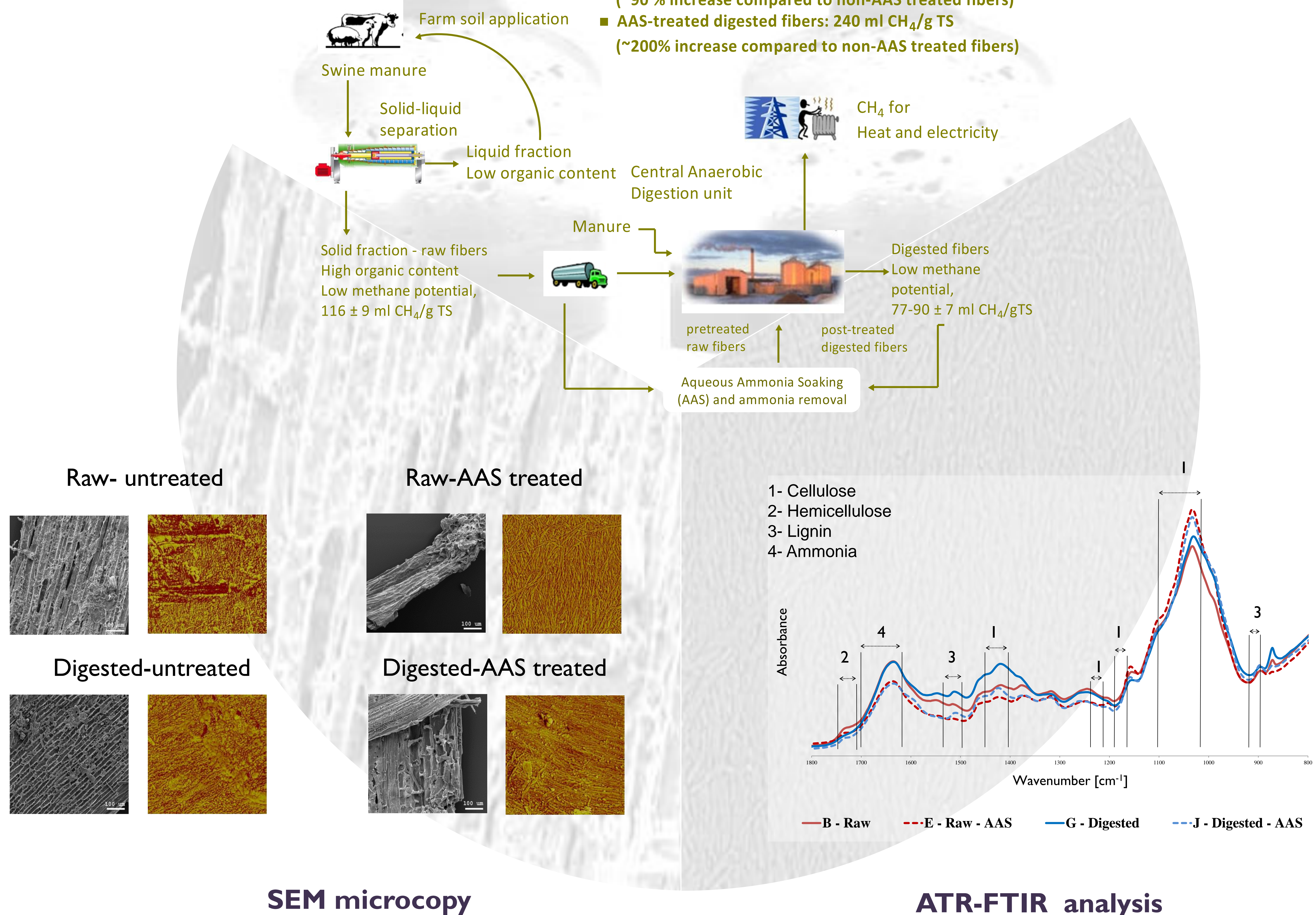
## Aqueous ammonia soaking (AAS) as pretreatment

Ammonia is a weak base and has high selectivity toward the lignin reactions, preserving thus the carbohydrates. It cleaves the ether bonds in lignin and the ether and ester bonds between lignin and hemicellulose. **Aqueous ammonia soaking (AAS)** and subsequent ammonia removal has been successfully applied for increasing methane productivity of raw and digested manure fibers (Jurado et al 2013). The present study investigates the structural and molecular changes that AAS had on raw and digested manure fibers.

### Process

**Methane yield obtained after continuous AD:**

- AAS-treated raw fibers : 230 ml CH<sub>4</sub>/g TS (~90 % increase compared to non-AAS treated fibers)
- AAS-treated digested fibers: 240 ml CH<sub>4</sub>/g TS (~200% increase compared to non-AAS treated fibers)



### Conclusion

- AAS increase methane potential using raw and digested manure fibers.
- SEM and AFM images of the same samples showed intact plant tissues and microfibrils and surfaces cleansed of debris, supported by IR spectra that indicated more cellulose had become exposed on the surface.
- delignification is not strictly necessary for increasing methane potential; increasing cellulose accessibility is a larger factor in increasing biogas potential and productivity.

### Acknowledgements

The authors wish to thank the EUDP-2008, Energistyrelsen, Copenhagen for the financial support of this work under RETROGAS project.

### Reference

E. Jurado, I.V. Skiadas, H.N. Gavala. 2013. Enhanced methane productivity from manure fibers by aqueous ammonia soaking pretreatment. Applied energy, vol. 109, 104-111.